REMARKS

Reconsideration is requested for claims 1-21.

Initially, the undersigned wishes to thank Examiners Gonzalez and Tamai for their time, attention, and consideration during the interview that was conducted at the U.S. Patent and Trademark Office on January 31, 2003.

In the Official Action, the drawings were objected to under 37 C.F.R. § 1.83(a) on the grounds that they do not show every feature of the invention specified in the claims. Specifically, it was asserted in the Official Action that the drawings do not show that electrical supplies of the stator sections have been shifted 180° electrical relative to electrical supplies of every tooth of a second set of every tooth of the stator sections. During the interview, it was agreed that the claims would be amended to clarify that there need not be a separate electrical supply for each tooth. Also during the interview, it was agreed that the objection to the drawing would be overcome by providing a perspective view of the motor shown in FIG. 1 showing a physical angular shift of $360°/n \pm$ skew angle between stator sections in a manner analogous to the manner that a physical shift is illustrated in FIG. 1A of U.S. Patent No. 5,652,493 to *Hendershot*, including a schematic representation of the 180° electrical phase shift of the power supplied to the stator sections. A Request for Approval of New Drawing Figure accompanies the present response and includes proposed new FIG. 5 that shows the subject matter in question. No new matter is added. Withdrawal of the objection is cordially urged.

The claims were rejected under 35 U.S.C. § 112, first paragraph. As discussed during the interview, the rejection concerns whether the proposed amendment and drawing

changes in the August 20, 2002, Official Action are supported by the original specification. During the interview, it was agreed that the proposed claim amendments and drawing changes would overcome the rejection. Withdrawal of the rejection is cordially urged.

Claims 1-21 were rejected under 35 U.S.C. § 112, second paragraph, on formal grounds. The claims have been amended to delete references to "electrical supplies". During the interview, it was agreed that the claim amendments overcome the rejection under 35 U.S.C. § 112, second paragraph, and withdrawal of the rejection is cordially urged.

In addition to the amendments relating to the electrical supplies noted above, the claims are also amended to slightly modify how the physical shift of the stator sections is defined. It is submitted that no new issues requiring further consideration and/or search are raised by the proposed amendment to recite that "the stator sections are physically shifted relative to one another in a circumferential direction by $360°/n \pm$ an angle related to skew" as this subject matter has already been the subject of search and consideration. The proposed amendment is submitted to merely better define the invention.

Claims 1-3, 9-12, and 19-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,652,493 to *Hendershot* in view of U.S. Patent No. 6,031,304 to *Suzuki et al.* *Hendershot* discloses a direct current motor in the form of an Switched Reluctance (SR) motor. A SR motor is driven by a switched field that is generated by subsequent excitation of poles of a stator. *Hendershot* discloses a first and a second stator mounted on the same axle. The second stator is rotationally skewed in relation to the first stator by 22.5°. Rotation is attained by sequentially energizing a first

phase of the first stator, then energizing a first phase of the second stator, then energizing a second phase of the second stator, and then energizing a second phase of the first stator, and then energizing a second phase of the second stator.

Hendershot does not disclose an induction machine -- which is an alternating current (AC) machine -- as claimed in the present application. *Hendershot* discloses a DC machine.

Hendershot does not disclose that stator sections are mutually and physically phase shifted by substantially 360°/n electrical $\pm$ an angle related to skew. *Hendershot* discloses a motor with two stator sections that are shifted 22.5° relative to each other. A machine with two stator sections physically shifted according to the claims of the present application would be shifted 180° $\pm$ a skew angle. As *Hendershot* is understood, it is necessary that stator teeth on succeeding stator sections not be physically axially aligned or the invention will be destroyed for its intended function. If the two stators of *Hendershot* were physically shifted 180° (360°/n), all of the stator teeth would be aligned. A modification that would destroy an invention for its intended function is, of course, impermissible.

Hendershot does not disclose power supplied for the teeth of a first set of n/2 of the stator sections is shifted 180° electrical relative to power supplied for the teeth of a second set of n/2 of the stator sections. As noted previously, *Hendershot* discloses a DC machine, not an AC machine where power supplied to different stators can be electrically phase shifted.

Nothing in *Hendershot* indicates that the description is valid for any other types of electrical machines, especially not induction machines. To alter the device of *Hendershot* and achieve the invention according to claims 1 or 11 the person skilled in the art would

have to convert the SR motor to an induction machine and add the features specified above. *Hendershot* does not disclose or suggest how this would have been done, nor is there any motivation for such a significant modification.

Contrary to the assertion in the Official Action *Suzuki et al.* does not disclose that stator sections 5a, 5b are phase shifted by 180 degrees. *Suzuki et al.* discloses a claw pole type stepping motor. Such a motor is, per definition, formed by an assembly of two stator yokes with axially extended teeth, "claws", overlapping each other in the axial direction. The rotor of the motor is a permanent magnet. *Suzuki et al.* discloses an arrangement of a first and a second stator, each including a coil having an assembly of two stator yokes, wherein the second stator is turned upside down relative to the first which is explained to result in a phase difference of 90° in *electrical* angle between the first and the second stator (see column 4, line 36-41).

In order to cancel tertiary high harmonic waves induced in the stator pool teeth the geometry of the teeth are changed. The change of geometry makes the tertiary high harmonic waves induced in the teeth of the two stator yokes, respectively, deviate from each other by 180 degrees in electrical, thus canceling each other.

Thus, *Suzuki et al.* does not disclose that stator sections are physically shifted relative to one another in a circumferential direction by $360°/n \pm$ an angle related to skew, and wherein power supplied for the teeth of a first set of n/2 of the stator sections is shifted 180° electrical relative to power supplied for the teeth of a second set of n/2 of the stator sections as is recited in claims 1 and 11.

Suzuki et al. does not cure the defects of *Hendershot*. Moreover, one skilled in the art would not have been motivated to modify *Hendershot* in view of *Suzuki et al.* for numerous reasons, not the least of which is that the modifications necessary to yield the present invention would have destroyed the alleged invention of *Hendershot* for its intended function.

In view of the differences between claims 1 and 11 and *Hendershot* in view of *Suzuki et al.*, it is respectfully submitted that claims 1 and 11 and the claims dependent therefrom define patentably over the cited references.

Claims 4 and 13-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hendershot* in view of *Suzuki et al.* and JP 406245456A (*Taguchi*). *Taguchi* was cited as allegedly disclosing a stator made of magnetic powder. *Taguchi* cures none of the defects of *Hendershot* in view of *Suzuki et al.* discussed above with regard to claim 1, from which claims 4 and 13-15 depend. Accordingly, claim 1 and the claims dependent therefrom, including claims 4 and 13-15, are submitted to define patentably over *Hendershot* in view of *Suzuki et al.* and *Taguchi*.

Claims 8, 17, and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hendershot* and *Suzuki et al.* in view of U.S. Patent No. 5,763,978 to *Uchida et al.* *Uchida et al.* was cited as allegedly disclosing an electrical machine with tips of teeth that extend axially. *Uchida et al.* cures none of the defects of *Hendershot* in view of *Suzuki et al.* discussed above with regard to claim 1, from which claims 8, 17, and 18 depend. Accordingly, claim 1 and the claims dependent therefrom, including claims 8, 17, and 18,

are submitted to define patentably over *Hendershot* in view of *Suzuki et al.* and *Uchida et al.*

Claims 5-7 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hendershot* in view of *Suzuki et al.* and *Taguchi* and U.S. Patent No. 6,049,153 to *Nishiyama et al.* *Taguchi* was cited as allegedly disclosing a stator made of magnetic powder as recited in claim 4. As noted above, *Taguchi* cures none of the defects of *Hendershot* in view of *Suzuki et al.* discussed above with regard to claim 1, from which claim 4 depends and, accordingly, claim 1 and the claims dependent therefrom, including claim 4, are submitted to define patentably over *Hendershot* in view of *Suzuki et al.* and *Taguchi*. *Nishiyama et al.* was cited as allegedly disclosing stator sections made of separated units. *Nishiyama et al.* cures none of the defects of *Hendershot* in view of *Suzuki et al.* and *Taguchi* discussed above with regard to claims 1 and 4, from which claim 5-7 and 16 depend and, accordingly, claims 1 and 4 and the claims dependent therefrom, including claim 5-7 and 16, are submitted to define patentably over *Hendershot* in view of *Suzuki et al.*, *Taguchi* and *Nishiyama et al.*

It is respectfully submitted that all of the pending claims, claims 1-21, are in condition for allowance. Allowance is cordially urged.

If the Examiner should be of the opinion that a telephone conference would be helpful in resolving any outstanding issues, the Examiner is urged to contact the undersigned.

Respectfully submitted,

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AMENDMENTS TO THE SPECIFICATION:

Kindly amend the Specification as follows:

At Page 3, line 23, delete the paragraph added in the amendment filed August 20, 2002, that reads:

"FIG. 4 illustrates a stator with a single winding on each tooth.

FIG. 5 is a schematic exploded view of a stator according to an embodiment of the present invention together with an electrical supply."

After the paragraph added at Page 3, line 22, in the amendment filed June 14, 2002, and before the heading "Description of the preferred embodiment" and the paragraph beginning at Page 3, line 23, insert the following paragraphs:

--FIG. 4 illustrates a stator with a single winding on each tooth.

FIG. 5 is a schematic exploded view of two stator sections of an induction motor according to an embodiment of the present invention.--.

Replace the paragraph beginning at page 3, line 34, with the following:

--The yoke sections 4 and 5 are physically phase shifted by 180° [electrical] $\pm$ an angle that is related to skew (not shown). Their electrical supplies are also shifted by 180° electrical as seen in [FIG. 5, wherein teeth 7a, 7b, and 7c, respectively,] FIG. 1 wherein the electrical supply $V_{\theta+180}$ of a second stator section [are] is positioned differently from the [corresponding stator teeth 6a, 6b, and 6c, respectively,] electrical supply V_{θ} of a first stator section. Preferably, the electrical [supplies] supply of every tooth of a first set the

stator sections is shifted 180° electrical relative to the electrical [supplies] supply of every tooth of a second set of stator sections. [This may, for example, be achieved by alternating the supply wires connected to the winding of each tooth of a first set of stator sections relative to the supply wires connected to the windings of the teeth of a second set of stator sections, but it may also be seen as a phase shift operation performed on the electrical supply. In FIG. 5, one embodiment of this relation is shown for a stator having two stator sections, i.e. the first set of stator sections and the second set of stator sections each contains one stator section. As seen in FIG. 5, the electrical supply wires connected to a tooth 7a of the second stator is alternated in relation to the electrical supply wires connected to the corresponding tooth 6a of the first stator.] FIG. 3 illustrates the electrical supplies connected to stator sections 1 and 2 and mutually phase shifted 180° electrical. Further, the stator sections 2 and 3 are separated by a small air gap 10 so as to reduce the mutual influence of the magnetic fields in the two stator sections 2 and 3.--.

AMENDMENTS TO THE CLAIMS:

Kindly amend the claims as follows:

1. (Four Times Amended) A stator for an electrical induction machine, comprising an even number n of stator sections at different axial positions, each section having a plurality of circumferentially separated, radially extending teeth and each tooth having a single winding,

wherein the stator sections are [mutually and physically phase shifted by substantially] physically shifted relative to one another in a circumferential direction by 360°/n [electrical] ± an angle related to skew,

and wherein [electrical supplies of every tooth] power supplied for the teeth of a first set of n/2 of the stator sections is shifted 180° electrical relative to [electrical supplies of every tooth] power supplied for the teeth of a second set of n/2 of the stator sections.

11. (Four Times Amended) An electrical induction machine having a rotor and a stator, wherein the stator comprises an even number n of stator sections at different axial positions, each section having a plurality of circumferentially separated, radially extending teeth and each tooth having a single winding, wherein the stator sections are [mutually and physically phase shifted by substantially] physically shifted relative to one another in a circumferential direction by 360°/n [electrical] ± an angle related to skew, and wherein [electrical supplies of every tooth] power supplied for the teeth of a first set of n/2 of the stator sections is shifted 180° electrical relative to [electrical supplies of every tooth] power supplied for the teeth of a second set of n/2 of the stator sections.